Technical Report 627

The Impact of Occupational Specialty and Soldier Gender on First Tour Enlisted Attrition

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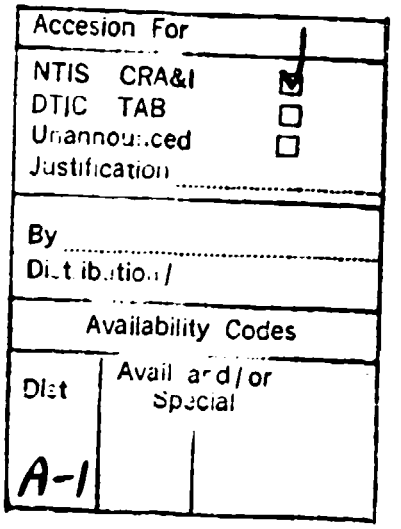

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The purpose of this research was to determine the effect of individual and organizational variables on first-tour soldier attrition. All female recruits and a 10% sample of noncombat male recruits entering the Army in FY76 were studied. Multidimensional chi-square analyses were utilized for the individual analyses and analysis of variance was used to compare Military Occupational Specialty (MOS) attrition rates. Results showed major differences by gender, type of attrition, traditionality of MOS, education, and race. Females had a higher attrition rate overall. Also, (Continued)

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females had higher attrition due to family-related reasons, and males had higher attrition due to adverse causes. Females in nontraditional MOSs had higher attrition than females in traditional MOSs. High school graduation was the single best predictor of first-tour success. Blacks had lower attrition than whites in the noncombat MOSs, with female blacks having the lowest attrition rate. Keywords: Cohort sampling, Separation category.

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FOREWORD

The Retention Team of the Personnel Utilization Technical Area performs research in attrition and in retention of noncommissioned officers (NCOs). The scope of this report is first-term enlisted attrition--separation from the Army before conclusion of a 3- or 4-year first term.

This research was a preliminary investigation. The goal was to discover those variables most associated with attrition. More detailed investigations of particular enlisted subgroups, for example, Military Occupational Specialties, are planned and are expected to identify probable causes of high attrition.

The Retention Team plans to develop counterattrition programs that use these findings as well as those of unit attrition research.

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THE IMPACT OF OCCUPATIONAL SPECIALTY AND SOLDIER GENDER ON FIRST-TOUR ENLISTED ATTRITION

EXECUTIVE SUMMARY

Requirement:

Recruiting and retaining qualified soldiers is a permanent problem and challenge for the Army personnel community. The ultimate goal is to reduce first-term enlisted attrition without sacrificing quality of the individual soldier. Recognition of what individual and organizational variables are associated with attrition and how they relate to each other is the first step toward that goal. A more detailed study of particular enlisted subgroups, individual soldiers, and supervisors' attitudes and opinions will lead to more causative conclusions regarding attrition. This information will be needed for counter-attrition programs.

Procedure:

This research pertains to the first requirement--finding the multiple associations of individual and organizational variables with attrition. All women and a 10% random sample of men from the FY 1976 noncombat enlistees formed the data base. Individual soldier data were analyzed using multidimensional chi-square techniques and an attrition-nonattrition criterion. Military Occupational Specialty (MOS) attrition was analyzed using analysis of variance of particular MOS attrition rates.

Findings:

Possession of a high school diploma was the best single predictor of successful completion of the first tour. The degree to which a given MOS is a traditional job for women was also moderately correlated with attrition, as was the race of the soldier. The female attrition rate in the traditional female administrative and medical occupations was below the rate for the less traditional and nontraditional MOS groups. Blacks separated less than whites in the noncombat jobs.

Males and females were sharply differentiated in quantity and type of attrition. In the FY 1976 cohorts, females had higher aptitude scores and a larger percentage of high school graduates, but higher attrition rates. Females typically were separated for family or other administrative reasons; males were separated earlier in the training phase and for adverse reasons later in the tour.

The analysis of variance based on MOS attrition showed that the particular type of military work did not predict MOS attrition.

Utilization of Findings:

As exploratory research, the findings indicate the direction of more specific research to find causal links of attrition. Future research should (1) study specifically the nature of the female family-type separations, (2) determine the reason for the low attrition rate for blacks, and (3) determine the differences between individual expected attrition at the beginning of the first enlisted term and actual attrition. Knowledge of attrition predictors will lead to an MOS attrition scale. It is possible to determine excess MOS attrition--the excess level that cannot be predicted by the summation of individual predicted attrition at accession into the Army. Study of excess MOS attrition could be used for counterattrition programs in the form of counseling or training for individual soldiers, noncommissioned officers (NCOs), and officers.

THE IMPACT OF OCCUPATIONAL SPECIALTY AND SOLDIER GENDER ON FIRST-TOUR ENLISTED ATTRITION

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THE IMPACT OF OCCUPATIONAL SPECIALTY AND SOLDIER GENDER ON FIRST-TOUR ENLISTED ATTRITION

OVERVIEW

The major purpose of this research was to determine the effects of soldier gender, type of occupational specialty, educational level, race, and qualification test scores on soldier attrition from the Army during the first tour. According to the Chief of Staff of the Army, recruiting and retaining qualified personnel is one of the most difficult challenges facing the Volunteer Army (cf. Meyer, 1980). The challenge is all the more difficult because the population from which most soldiers have traditionally been recruited--17- to 20-year-old men--is shrinking. It is estimated that by 1992, 37 of every 100 eligible 18-year-old men must be recruited to maintain the All Volunteer Force Army (Fox, 1979). As the recruitment of men becomes more difficult, the alternative of recruiting women receives greater consideration as a way to fulfill enlisted force goals. As of March 31, 1982, the enlisted population in the Regular U.S. Army was 56,000 women, compared with 543,000 men. The Office of the Deputy Chief of Staff for Personnel has a goal to increase the female enlisted strength to approximately 70,000 by the end of fiscal year 1987 (ODCSPER, 1982). Although recruiting to achieve this number of women does not currently pose a problem, questions concerning different rates of attrition by male and female recruits suggest that maintaining this number of female soldiers may be more difficult.

For the 1975 Cohort Group, the Army experienced an overall attrition rate for men of 37.4% (26.6% for high school graduates and 50.4% for nongraduates) among first-term enlistees. For women, the rate was slightly higher--39.2% (36.8% for high school graduates and 58.0% for nongraduates).

Attrition, whether from male or female losses, is costly to the Army. Some of the costs are incurred by any recruit: recruiting, training, and in-processing. Additional costs specific to attritees are attritee out-processing, replacement recruiting, replacement training, and unit replacement in-processing. In addition, personnel turbulence may affect unit readiness and unit effectiveness. Consequently, the Army is interested in finding ways to reduce the attrition of qualified male and female personnel.

This intent is reflected in many studies of attrition (cf. Sinaiko, 1977). These studies have focused either on male attrition or on general attrition (e.g., Helme & Katz, 1962; Frank & Erwin, 1978; Goodstadt, Yedlin, & Romanczuk, 1978; Goodstadt & Yedlin, 1979). Only recently, with the advent of larger numbers of women in the military, has attrition research differentiated between men and women (e.g., Fox, 1979; Martin, 1977; Binkin & Bach, 1977; Thomas, 1980). The analyses distinguishing male and female attrition have uncovered some interesting differences.

Time in Service and Attrition

Martin (1977) compared attrition of male and female cohorts for fiscal years 1971, 1972, 1973, and 1974 for all services. He found that attrition

was greater for women than for men in the fiscal years 1971, 1972, and 1973 cohorts. Data for the fiscal year 1974 cohort indicated no difference between male and female attrition. In addition, his data showed that female attrition was lower than male attrition for the first 3 months of service. From the 4th through 24th month, however, female attrition was higher than male attrition. Martin's report did not address the specific effects of the draft (in 1971), the end of the draft (from 1972 on), entrance requirements, and the percentage of high school graduates on attrition.

Fox (1979), in a study of Army attrition, uncovered similar trends. Fox compared male and female attrition rates for enlistees in fiscal years 1975, 1976, and 1977 (projected for a completed 1977 cohort group). He found that attrition was greater for men than women during the first 3 months of service. After the first 3 months, however, male attrition fell below female attrition. Over the first 36 months of service, female attrition was much higher than male attrition.

MOS Traditionality and Attrition

Addington (1979) and Tolk (1978) tried to explain the higher rate of female attrition. They hypothesized that higher female attrition could be attributed to use of women in nontraditional Military Occupational Specialties (MOSs).[1]

Addington hand-picked 19 MOSs to present a spectrum of highest to lowest female attrition rates.[2] He found that "females have the highest attrition rates in what (positions) are defined as non-traditional skills for women, median attrition in less traditional and the lowest attrition in traditional skills" (p. 5). For men, nontraditional female jobs had the highest attrition, less traditional MOSs had median attrition, and traditional female MOSs had the least attrition. "In other words, men's attrition rates, while generally lower, follow the same pattern as women's attrition rates" (p. 5).

In a second analysis, Addington correlated male and female attrition rates for all MOSs that women can occupy. He reported results that support his previous data. On the basis of his second correlational analysis, Addington concluded, "This study invalidates the theory of the relationship between high female attrition and non-traditional skills, because men have high attrition, medium, and low attrition in the same skills as women . . .

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[1]Military Occupational Specialty (MOS) is a technical term referring to a "job" in the sense used by McCormick and Tiffin (1974). There are about 250 entry-level MOSs in the Army, from infantryman to clerk. Throughout this report the terms Military Occupational Specialty, MOS, specialty, and occupational specialty will be used interchangeably.

[2]The categories of female traditionality were based on the percentage of female fill of particular positions in the civilian community. Each MOS was equated, by job description, to a civilian occupation in the Addington research. Each MOS then received its traditionality rating on the basis of the corresponding civilian occupation. The traditionality ratings were traditional female, less traditional female, and nontraditional female.

the female MOS attrition is higher by a constant amount in almost every MOS . . ." (p. 10).

Tolk (1978) analyzed the attrition data of 15,700 women who "(1) had a 09E PMOS (female trainee designator) during any month from September 1974 through February 1975; (2) entered the Army no earlier than April 1974; and (3) had at some time been assigned to one of the PMOS" noted as either traditionally female or traditionally male. He found that women in nontraditional female specialties had higher attrition rates than either their male or female counterparts in traditionally female specialties. The difference between male and female attrition rates, however, was small, ranging from 1.0% in the 17th month to 4.8% in the 7th month.

Wood, Pappas, Lovely, and Johnson (1979) studied male and female soldiers who migrated into or out of traditional specialties in their second enlistment. They found that "soldiers who are Army career-committed tend to migrate to occupations traditional to their gender" (p. 4).

The Tolk and Wood et al. data appear to contradict Addington's data on the impact of traditionality of specialty on attrition. Although it is uncertain whether traditionality of MOS can explain the higher attrition for enlisted women, overall analyses indicate that female attrition is higher than male attrition.

Pregnancy and MOS-Specific Attrition

Several hypotheses attempt to account for the overall difference in attrition rates for men and women. For example, only women are eligible for separation due to pregnancy, and such discharges are not uncommon for female soldiers during their first tour. Some authors have speculated that if separation from the service were not an option, the attrition rates for men and women would be comparable (cf. Thomas, 1980; Olson & Stumpf, 1978).

A second hypothesis, proposed by Addington (1979), is that attrition rates differ for different specialties. Attrition rates for both men and women may be higher in certain MOSs than in others regardless of gender differences. It is also possible that attrition rates may differ between men and women in the same MOS. In terms of attrition, certain specialties may be better suited for women; others may be better suited for men.

Although it is true that female soldiers' attrition rates are higher overall, there is little agreement on the reasons for this difference. Are higher female attrition rates due to the traditionality of the occupational specialty, other characteristics of the MOS regardless of traditionality, less stringent discharge policies for women (i.e., pregnancy and childcare), or some combination or interaction of these and other factors? Other factors that might be relevant include those traditionally evaluated in attrition research: education, age, race, and qualification test scores.

SPECIFIC OBJECTIVES

The major objective of this research was to determine the degree to which the first-tour attrition rate varies as a function of gender, education, qualification test score, race, traditionality of occupational specialty, and the interactions of these factors. A related objective was to determine the degree to which the type of attrition varies as a function of gender, education, qualification test score, race, traditionality of specialty, and the interactions of these factors.

METHOD

Data Base

The data base for this research comprised all fiscal year 1976 non-prior-service, 3- and 4-year female enlistees ($\underline{N}$ = 15,702) and 10% of all fiscal year 1976 non-prior-service, 3- and 4-year male enlistees ($\underline{N}$ = 16,228) on the Defense Manpower Data Center (DMDC) 1976 Enlisted Cohort Data Base (DMDC, 1980a). (Six-year and "other" terms of enlistment were excluded from this analysis.) Male enlistees were selected on the basis of the last digit of their social security number. This reflects a 10% numerical representation sampling of males and 100% population of females as based on the DMDC report #968 (March 1980) of fiscal year 1976 entrants: 163,009 males and 15,718 females. Because race or ethnic group is a major variable in the analysis and the number of nonblack, nonwhite, "Other" personnel was too small for analysis ($\underline{N}$ = 680), these personnel were dropped from the sample. In addition, 458 cases with missing or noncodable separation codes were deleted from the data base. A total sample of 30,793--15,60. men and 15,188 women--remained.

The data bas was established with data available on 30 September 1979. Four-year enlistees who entered between 1 October 1975 and 30 June 1976 would not have separated from the service or completed their first term of enlistment by 30 September 1979. Consequently, data are incomplete on character of service, separation codes, separation month and year, and eligibility to reenlist for those 4-year enlistees. Data for only the first 36 months of service for both 3- and 4-year enlistees were evaluated. All soldiers in the sample still in the Army as of 30 September 1979 were considered to be nonattritees. A comparison between the data base and the 1976 cohort population is shown in Table 1. No differences in composition are apparent.

The total sample was examined for representativeness on three variables: gender, term of service, and education. A tabulation of gender by term of service is shown in Table 2. It indicates that the majority of the soldiers in this study were 3-year enlistees (73.9% of all men and 80.1% of all women). Table 3 indicates that 45.4% of the men in the sample were not high school graduates and 54.6% were high school graduates. This is comparable to the statistics for the Army first-term population in the DMDC fiscal year 1976 recruit profile (March 1980). According to DMDC Report #968 (DMDC, 1980b), 46% of the 1976 male cohorts had no high school diplomas (GEDs were included in this category) and 54% had high school diplomas. The total population of female soldiers is in the data set, so analyses to determine comparability are redundant.

Table 1

Comparison of Fiscal Year 1976 Data Base and Army Enlisted Population

Gender and race	ARI data base[a] N	ARI data base[a] Percentage of gender total	DMDC 968 N	DMDC 968 Percentage of gender total
Male				
Total	16,228		163,009	
Black	4,052	25	40,691	25
Nonblack	12,176	75	122,318	75
Female				
Total	15,702		15,718	
Black	2,791	18	2,810	18
Nonblack	12,911	82	12,908	82

[a] N = 31,931; data on gender are missing for one case.

Table 2

Term of Service by Gender of Study Population

Gender	Term of service: 3 Years	Term of service: 4 years	Total
Male	11,532 (73.9%)	4,073 (26.1%)	15,605
Female	12,159 (80.1%)	3,029 (19.9%)	15,188
Total	23,691	7,102	30,793

Table 3

Education by Gender of Study Population

Gender	Education: Non-high school graduates N	Non-high school graduates Percentage	High school graduates N	High school graduates Percentage	Total
Male	7,080	45.4	8,519	54.6	15,599
Female	1,641	10.8	13,546	89.2	15,187
Total	8,721	28.3	22,065	71.7	30,786

Note. Seven cases lacking data on education are not included in the totals.

On the basis of term of service and education, the men in this study appear to be a representative sample of the entire fiscal year 1976 Male Cohort File.

Samples

One of the objectives of this research was to determine the effect of gender on attrition. Consequently, only those MOSs with sufficient numbers of men and women were analyzed. The sample used in the analysis consisted of 85 MOSs from the data base. The criterion for selection was that at least 10 men and 10 women must be in the MOS. This, of course, meant that no combat MOSs were included, since women are excluded from those specialties.

The 85 MOSs were further subdivided into two categories: female high-fill MOSs and female low-fill MOSs. Female high-fill MOSs were defined as those MOSs with at least 100 women. Female low-fill MOSs were those with 10 to 99 women. This provided an opportunity to determine whether analyses of the two categories would yield similar results. Three samples (S1, S2, and S3) were identified:

S1 = Combined sample (all personnel in MOSs having at least 10 men 10 women)

S2 = Female high-fill sample (all personnel in MOSs having at least 10 men and 100 women)

S3 = Female low-fill sample (all personnel in S1, but not in S2)

S1 = S2 + S3

Analyses are reported in the text only for the combined sample (S1) and the female high-fill sample (S2). The results for the low-fill sample (S3) differed little from the results for the high-fill sample and are shown in the appendixes only.

VARIABLES

To make the data analyses comparable to standard Office of the Deputy Chief of Staff for Personnel (ODCSPER) and DMDC reports, the variables were structured in the following ways.

1. Female Traditionality. ODCSPER has divided the Army MOSs into three female job traditionality categories: traditional, less traditional, and nontraditional. This division was used for the purpose of this research, with one exception: All but two physically demanding communications MOSs were moved from the nontraditional to the traditional category. The MOSs left in the nontraditional category were Wire Systems Installer (36C) and Tactical Wire Operations Specialist (36K).

2. Gender. Male versus female.

3. Race. White versus black (all nonwhite, nonblack, "others" were excluded from the analysis due to their small numbers).

4. Education. The enlistees were categorized into two groups: (1) those who were diploma graduates from high school (HSDG) and (2) those who either did not complete high school or received the GED certificate of high school equivalency (NHSDG).

5. Armed Forces Qualification Test (AFQT) Score. The AFQT is the general aptitude test composite used in the military. It is comprised of verbal and math components. The AFQT score range is divided into five categories: I (93rd-100th percentile), II (65th-92nd percentile), III (31st-64th percentile), IV (10th-30th percentile), and V (1st-9th percentile). For these analyses, the scores were dichotomized to compare a group with higher mental aptitude (scores in categories I and II) with a group of lower mental aptitude (scores in categories III and IV). This particular dichotomy was chosen to obtain a reasonable proportion of each gender in each AFQT group (the minimum entry score for women in fiscal year 1976 was the 59th percentile--high category III). Category V scores are below the acceptable level for both male and female enlistment.

6. Type of Discharge Action. The Army recognizes and records a large number of reasons for separation, and there are many ways to classify these reasons. For the purposes of this report, separations were classified into eight categories: (1) training discharge (TDP), (2) expeditious discharge (EDP), (3) medical discharge, (4) pregnancy, (5) other family-related discharge, (6) other adverse discharge, (7) other nonadverse discharge, and (8) completion of 36 months of active duty.

7. Military Occupational Specialty. In this research, the specialty recorded was the specialty from which an individual had been discharged (or, for some 4-year enlistees, the specialty in which an individual was currently serving). Consequently, the MOS reported here may not be the MOS in which the soldier was trained.

ANALYSES

Two techniques of data analysis, multidimensional chi-square tests and repeated measures analysis of variance (ANOVA), were used to assess statistical differences between attrition rates. The two techniques were used to analyze two types of dependent variables. The multidimensional analyses used attrition-nonattrition as a dichotomous dependent variable. A dichotomous distribution in the dependent variable is not usually tenable for analysis of variance because of the normality assumption. Also, since the independent variables included both ordinal and nominal data, the chi-square analyses were quite appropriate for multidimensional comparisons. The analysis of variance used the attrition rate of a group in a particular MOS as the dependent variable. The attrition rate measure, while not distributed normally, does not seriously violate ANOVA distribution assumptions.

The primary analysis technique was the multidimensional chi-square test. The unit of analysis was the attrition or nonattrition of individuals in their first 36 months of duty. This attrition dichotomy was treated as a factor in the analysis. The resulting multiway tables described the frequencies and all interactions of frequencies between variables. Only likelihoods of $p < .01$ are reported for those statistical tests involving attrition and one or more associated variables. This probability level was used because of the large number of cases per cell. With large samples, very small differences can lead to statistically significant effects. By choosing a relatively low probability level, the probability that this effect occurs by chance can be reduced without giving up much statistical power for identifying real differences and effects.

The reader should note that the two-way tables shown are similar to main effects in the analysis of variance, because one of the dimensions in the chi-square table is the dependent variable. Therefore, three-way tables describe the interaction of two independent variables and a dependent variable. In other words, attrition is treated as the dependent variable in the analysis, although the mathematical treatment of these frequency tables analyzes effects of all dimensions equally.

The design for the repeated measures analysis of variance was as follows:

Traditionality level	Gender	
	Male	Female
Traditional	XA, XB,...XK	XA, XB,...XK
Less traditional	XL, XM,...XP	XL, XM,...XP
Nontraditional	XQ, XR,...XZ	XQ, XR,...XZ

This technique was used to determine the relationships between MOS attrition rates, gender, and female job traditionality. In the layout, each observation (X) represents a single MOS attrition rate for one gender-traditionality combination. (The attrition rate for each MOS is shown in Appendix A.) The

repetition in the design was over MOSs, not individuals. Different groups of people were in each MOS. The within-cell variance in the analysis was based on MOS groupings.

The variance comparison for gender was the within-MOS variance not accounted for by gender or gender by traditionality. Traditionality was tested by the variance between MOS groups not accounted for by the traditionality factor. A probability level of $p < .05$ was used because the number of cases (MOSs) per cell was relatively small. The analyses were computed using the raw attrition percentages as well as the transformation $Y = 2 (\arcsin X)$. The arcsin was used to transform the distribution of the dependent variable (essentially proportions separating per MOS in the raw score analysis) into a closer approximation of a normal distribution. In all cases, results were almost identical. Consequently, the results from the raw score analysis are reported here.

RESULTS

Variables Related to Attrition Rate

The first set of analyses was conducted to determine the extent to which attrition rates were a function of education, race, gender, traditionality of occupational specialty, and qualification test score.

Multivariate Chi-Square Analyses

The multivariate chi-square analysis was first conducted on data from the high fill sample including pregnancy-discharge cases. The statistically significant effects, their degrees of freedom, chi-square values, and probabilities are shown in Table 4. Attrition rates are shown in Table 5 for all cells included in the statistically significant effects and interactions.

Attrition rates varied significantly as a function of all variables: education, race, gender, traditionality, and AFQT score. The degree of variation, however, was markedly different among the variables. There was a marked difference in attrition between high school graduates and non-high school graduates: 35% versus 52%. Attrition was 41% for whites and 30% for blacks, and it was 36% for traditional specialties and 42% for nontraditional specialties. Men had 35% attrition, and women 41%. The rate for those scoring in the lowest AFQT categories was 37%, compared with 40% for high scorers.

Five interactions with attrition were significant: gender-education, race-gender, gender-AFQT, gender-traditionality, and race-education. Rates for men and women with high school diplomas differed greatly (22% and 39% for men and women, respectively), whereas without diplomas, the difference was small (51% versus 55%). White women had much greater attrition (42%) than black women (29%), whereas rates for white and black men were comparable (36% and 32%, respectively). Among high scorers on the AFQT, women had a much higher attrition rate (40%) than men (26%), but the rate for low-scoring women (44%) was similar to the rate for low-scoring men (38%). Women in nontraditional occupational specialties had much higher attrition rates than men in those same specialties (47% versus 36%), while in specialties traditional for women, female and male rates differed little (37% versus 34%).

Table 4

Multidimensional Chi-Square Analysis of Individual Attrition: High-Fill Sample

	df	Chi-square	Significance level
Effect			
Education	1	333	.0001
Race	1	157	.0001
Gender	1	58	.0001
Traditionality	2	36	.0001
AFQT	1	16	.0001
Interaction			
Gender-education	1	58	.0001
Race-gender	1	35	.0001
Gender-AFQT	1	22	.0001
Gender-traditionality	2	15	.0005
Race-education	1	10	.0014

Note. N = 15,385.

Table 5

Attrition Rate Table: Significant Chi-Square Interactions for High-Fill Sample

Variable	Attrition rate (percentage)	Number of attritees	Attrition rate (percentage)	Number of attritees	Overall attrition rate (percentage)	Total number of attritees
	Gender					
	Male		Female			
Education						
HSDG	22	3,011	39	9,030	35	12,041
NHSDG	51	2,244	55	1,100	52	3,344
Total	35	5,255	41	10,130		
AFQT						
High	26	1,537	40	7,183	37	8,720
Low	38	3,718	44	2,947	40	6,665
Total	35	5,255	41	10,130		
Traditionality						
Traditional	34	1,818	37	5,216	36	7,034
Less traditional	34	1,616	43	2,807	40	4,423
Nontraditional	36	1,821	47	2,107	42	3,928
Total	35	5,255	41	10,130		
	Race					
	White		Black			
Education						
HSDG	38	9,120	26	2,921	35	12,041
NHSDG	54	2,609	47	735	52	3,344
Total	41	11,729	30	3,656		
Gender						
Male	36	3,684	32	1,571	35	5,255
Female	44	8,045	29	2,085	41	10,130
Total	41	11,729	30	3,656		

The last significant interaction was the only one that did not involve gender. Among enlistees with high school diplomas, attrition rates were much higher for whites (38%) than for blacks (26%). Rates for enlistees without diplomas were more comparable (54% for whites and 47% for blacks). The results of the low-fill analysis were similar, although fewer significant effects and interactions were found (see Appendix B).

The high-fill analysis excluding the pregnancy cases resulted in almost equivalent male and female attrition rates: 35% and 34%, respectively. With this exception, the results were similar to the results of the high-fill analysis including the pregnancy cases. The same attrition effects (education, race, AFQT, and traditionality) and interactions (gender-education, race-gender, gender-AFQT, gender-traditionality, and race-education) were found to be significant, and the degree of the effects and interactions was highly similar (see Tables 4-7).

Table 6

Multidimensional Chi-Square Analysis of Individual Attrition: High-Fill Sample with Pregnancy Cases Omitted

	df	Chi-square	Significance level
Effect			
Education	1	475	.0001
Race	1	114	.0001
AFQT	1	51	.0001
Traditionality	2	49	.0001
Interaction			
Gender-education	1	44	.0001
Gender-race	1	33	.0001
Gender-AFQT	1	20	.0001
Gender-traditionality	2	16	.0005
Race-education	1	10	.0020

Note. N = 14,344.

Analysis of Variance

The multivariate chi-square analyses focused on attrition in terms of the proportion of people who stayed or separated within each category and subcategory. The specific MOS was not considered, except to the extent that it identified a person with the traditional, less traditional, or nontraditional category. ANOVA techniques were used to evaluate the effect of gender and traditionality on attrition, using the attrition rate of each MOS as the dependent variable. The results for the high-fill sample indicated that although there was a very large effect of gender on attrition rate, neither the traditionality effect nor the gender by traditionality effect was significant.

Table 7

Attrition Rate Table: Significant Chi-Square Interactions for High-Fill Sample With Pregnancy Attrition Cases Omitted

Variable	Attrition rate (percentage)	Number of attritees	Attrition rate (percentage)	Number of attritees	Overall attrition rate (percentage)	Total number of attritees
	Gender					
	Male		Female			
Education						
HSDG	22	3,011	32	8,114	29	11,125
NHSDG	51	2,244	49	975	51	3,219
Total	35	5,255	34	9,089		
Race						
White	36	3,684	37	7,158	37	10,842
Black	32	1,571	23	1,931	27	3,502
Total	35	5,255	34	9,089		
AFQT						
High	26	1,537	33	6,466	32	8,003
Low	38	3,718	37	2,623	37	6,341
Total	35	5,255	34	9,089		
Traditionality						
Traditional	34	1,818	30	4,718	31	6,536
Less traditional	34	1,616	36	2,508	35	4,124
Nontraditional	36	1,821	40	1,863	38	3,684
Total	35	5,255	34	9,089		
	Race					
	White		Black			
Education						
HSDG	32	8,345	22	2,780	29	11,125
NHSDG	52	2,497	46	722	51	3,219
Total	37	10,842	27	3,502		

These results are shown in Table 8. (The results for the low-fill sample, which were parallel, are in Appendix C.)

Table 8

Analysis of Variance for Gender x Traditionality: High-Fill Sample

Variation	SS	df	MS	F	Significance
Between MOS groups	10,384	27			
Traditionality	297	2	149	.93	NS
Error	4,017	25	161		
Within MOS groups	2,455	28			
Gender	1,312	1	1,312	33.68	*
Gender x traditionality	66	2	33	.85	NS
Error	974	25	39		

MOS traditionality	Attrition rate (%) Male	Female	Total	N
Traditional	28	37	32	14
Less traditional	29	38	34	6
Nontraditional	31	45	38	8
Total	29	40		

Note. N = 28.

*p < .01.

Parallel high- and low-fill analyses with pregnancy cases omitted yielded no significant effects. Summary tables for these analyses are in Appendix D.

Variables Related to Type of Attrition

Multiple chi-square analysis was used to assess the degree to which type of attrition was a function of gender. Only attrition cases entered into the sample (N = 7,881), so all proportions use the sum of attritees as the denominator. To increase the sample size, attrition cases from the high- and low-fill samples were combined.

Because pregnancy-related attrition is applicable only to females, two analyses were conducted: (1) relationships between all variables, including gender and attrition, but without the pregnancy category of attrition, and

(2) for the female sample only, relationship of all other variables and attrition, including the pregnancy category of attrition.

In the first analysis, all five dimensions were significantly associated with type of attrition (Table 9). The cell proportions and frequencies are shown in Table 10. Gender had the strongest association with type of attrition. Men separated because of adverse reasons at a proportion of .24, compared with .12 for women. Women separated for family reasons at a proportion of .17; the proportion for men was .03. Education also had a strong association with type of attrition, and again adverse and family separations were the only categories of some practical significance. Non-high school graduates had a much higher proportion of attrition in the adverse category (.24) than did high school graduates (.13). However, a higher proportion of high school graduates separated for family reasons (.14) than did non-nigh school graduates (.05).

Table 9

Multidimensional Chi-Square Analysis by Type of Separation: Combined Sample With Pregnancy Attrition Cases Omitted

	df	Chi-square	Significance level
Effect			
Gender	5	447	.0001
Education	5	206	.0001
AFQT	5	96	.0001
Traditionality	10	92	.0001
Race	5	24	.0003
Interaction			
Gender-education	5	34	.0001
Gender-race	5	25	.0002

Note. N = 6,598.

The other variables were related to type of attrition at lower chi-square levels and hence the differences between proportions are not so large in most cases. The high and low AFQT groups had similar patterns of attrition except for the proportions for family attrition: .14 for the high AFQT group and .08 for the low AFQT group.

In the area of traditionality, there were three types of attrition that showed differences in proportions greater than .05. Whereas the traditional MOSs had relatively high attrition early in the training cycle (a proportion of .37 for TDP) and lower attrition later in the training cycle (a proportion of .23 for EDP and .14 for adverse attrition), the opposite effect occurred for the nontraditional group. Persons in the nontraditional MOSs had a lower proportion of TDP attrition (.29) but a relatively higher proportion of EDP (.29) and adverse (.20) attrition.

Table 10

Type of Separation Proportions: Combined Sample With Pregnancy Attrition Cases Omitted

	Type of separation													
	TDP		EDP		Medical		Adverse		Nonadverse		Family		Total	
	Proportion	N	Proportion	N	Proportion	N	Proportion	N	Proportion	N	Proportion	N	Proportion	N
Gender														
Male	.33	910	.25	676	.13	358	.24	651	.02	43	.03	83	1.00	2,721
Female	.34	1,313	.26	1,008	.09	358	.12	471	.02	86	.17	641	1.00	3,877
Total	.34	2,223	.26	1,684	.11	716	.17	1,122	.02	129	.11	724	1.00	6,598
Education														
HSDG	.34	1,430	.26	1,096	.11	476	.13	567	.02	93	.14	601	1.00	4,253
NHSDG	.34	793	.26	598	.10	240	.24	555	.02	36	.05	123	1.00	2,345
AFQT														
High	.33	1,101	.25	840	.10	345	.15	487	.02	72	.14	479	1.00	3,324
Low	.34	1,122	.26	844	.11	371	.19	635	.02	57	.08	245	1.00	3,274
Traditionality														
Traditional	.37	868	.23	542	.11	250	.14	332	.02	51	.13	312	1.00	2,355
Less traditional	.37	619	.24	411	.12	195	.16	272	.02	28	.09	156	1.00	1,681
Nontraditional	.29	736	.29	731	.11	271	.20	518	.02	50	.10	256	1.00	2,562
Race														
White	.35	1,854	.25	1,355	.11	577	.16	874	.02	98	.11	592	1.00	5,350
Black	.30	369	.26	329	.11	139	.20	248	.03	31	.11	132	1.00	1,248

Finally, race had a statistically significant, but weak, association with separat type. The largest difference occurred in the proportion for TDP attrition: .35 for whites and .30 for blacks.

Two interactions between variables were associated with type of attrition (Table 11). For the gender by education interaction, only for adverse separation was there a difference of some practical importance. NHSDG men had a higher proportion of adverse separation than did HSDG men: .27 and .19, respectively. However, for women there was little difference between the NHSDG and HSDG proportions: .14 and .12, respectively.

The gender by race interaction was more complex. For EDP attrition, black men had an attrition proportion of .29, compared with .23 for white men. The direction of the difference was reversed for women: The proportion was .26 for white women and .23 for black women. Another reversal occurred in the proportions for family separation. There was little difference among the small proportion of men separated for this reason: for white men, .04; for black men, .02. But the proportion of black women who separated for family reasons (.24) was substantially greater than the proportion of white women who separated for family reasons (.15).

The second analysis included women only and added the pregnancy category of separation. Proportions were computed using all female separations as a base (Tables 12 and 13).

The variables that had significant chi-square associations with type of attrition for women were race, education, and traditionality. AFQT score, which had a restricted distribution for women, was not significantly related to type of attrition.

White women had a somewhat higher TDP proportion (.26) than black women (.20), and black women had a somewhat higher proportion of separation for family reasons (.18) than white women (.12). Women who were high school graduates separated because of pregnancy at a proportion of .26; the proportion for non-high school graduates was .19.

The traditionality variable had an effect on two separation categories, TDP and EDP. For TDP the proportion of separations was somewhat lower for nontraditional MOSs (.22) than for less traditional MOSs (.28) or traditional MOSs (.26). However, for EDP the proportions were .23, .20, and .17, respectively.

DISCUSSION

The multiple analyses conducted for this research measured the effect of several independent variables on attrition. Traditionality of MOS was clearly related to the female attrition rate. The fact that the male attrition rate across traditionality groups did not vary more than 2 percentage points implies only that no strong inverse effect occurred (i.e., nontraditional jobs did not imply low attrition rates for men). Although traditionality appeared to have a weak but statistically significant overall effect, it clearly was a valid

Table 11

Type of Separation by Significant Chi-Square Interactions: Combined Sample With Pregnancy Attrition Cases Omitted

Interaction		Type of separation: TDP Proportion	TDP N	EDP Proportion	EDP N	Medical Proportion	Medical N	Adverse Proportion	Adverse N	Nonadverse Proportion	Nonadverse N	Family Proportion	Family N	Total Proportion	Total N
Gender-education															
Male	HSDG	.34	342	.23	230	.16	163	.19	186	.03	26	.05	53	1.00	1,000
	NHSDG	.33	568	.26	446	.11	195	.27	465	.01	17	.02	30	1.00	1,721
Female	HSDG	.33	1,088	.26	856	.10	313	.12	381	.02	67	.17	548	1.00	3,253
	NHSDG	.36	225	.24	152	.07	45	.14	90	.03	19	.15	93	1.00	624
Gender-race															
Male	White	.34	681	.23	465	.14	267	.24	467	.02	32	.04	72	1.00	1,984
	Black	.31	229	.29	211	.12	91	.25	184	.02	11	.02	11	1.00	737
Female	White	.35	1,173	.26	890	.09	310	.12	407	.02	66	.15	520	1.00	3,366
	Black	.27	140	.23	118	.09	48	.13	64	.04	20	.24	121	1.00	511

Table 12

Association by Type of Separation: Females

Effect	df	Chi-square	Significance level
Race	6	39	.0001
Education	6	31	.0001
Traditionality	12	39	.0002

Note. N = 5,157. No interactions were significant.

Table 13

Type of Separation by Level of Effect: Females

Effect	Type of separation: TOP Proportion	TOP N	EDP Proportion	EDP N	Medical Proportion	Medical N	Pregnancy Proportion	Pregnancy N	Adverse Proportion	Adverse N	Nonadverse Proportion	Nonadverse N	Family Proportion	Family N	Total Proportion	Total N
Race																
White	.26	1,173	.20	890	.07	310	.25	1,104	.09	407	.02	66	.12	520	1.00	4,470
Black	.20	140	.17	118	.07	48	.26	176	.09	64	.03	20	.18	121	1.00	687
Total	.25	1,313	.20	1,008	.07	358	.25	1,280	.09	471	.02	86	.12	641	1.00	5,157
Education																
HSDG	.25	1,088	.20	856	.07	313	.26	1,132	.09	381	.02	67	.13	548	1.00	4,385
NHSDG	.29	225	.20	152	.06	45	.19	148	.12	90	.03	19	.12	93	1.00	772
Traditionality																
Traditional	.26	565	.17	368	.07	157	.26	559	.09	183	.02	41	.13	291	1.00	2,164
Less traditional	.28	382	.20	267	.07	95	.24	332	.09	128	.01	19	.10	137	1.00	1,360
Nontraditional	.22	366	.23	373	.07	106	.24	389	.10	160	.02	26	.13	213	1.00	1,633

predictor of female attrition. This contradicts Addington's conclusion that the pattern of male attrition follows the pattern of female attrition by traditionality grouping.

At first reading, the reader may see a contradiction in analyses, since traditionality did not reach statistical significance in the analysis of variance. However, using the attrition rate as the dependent variable for the analysis of variance created a totally different type of error term than in the chi-square analysis. The lack of significance in the analysis of variance can be explained by the large MOS-specific attrition variance incorporated within each cell; it overwhelmed variance due to traditionality. Hence, an eye on both analyses indicates that traditionality is related to attrition but can be outweighed by MOS-specific variance.

The fact that education had the single highest association with attrition corroborates decades of research in this area. The degree of this association was markedly different for men and women, however. The restricted range of education in the female group is the main reason why having a high school diploma appears to lower attrition among men more than among women. Because of 1975-76 selection standards, virtually all women had at least a GED high school certificate, whereas many of the men were high school dropouts.

Particularly striking is the overall race effect and the race-gender interaction in both the high- and low-fill samples. The lower attrition for blacks than whites is based primarily on much lower attrition for black women than white women. The pattern is consistent for every education-AFQT group from high-high to low-low. There is no easy explanation for the particularly low rate of black female attrition. Although the black women included a larger proportion of high school graduates than the white women, there was no supporting three-way race-gender-education interaction. Economic opportunity may be relatively high in the military for black women, however. The possibility of early military career interest in black women could then be a motivational force supporting the completion of the first term of service.

MOS attrition rates showed large fluctuations within gender and within traditionality of the MOS. Important unknown factors make a given MOS particularly high or low in attrition. Since the MOS environment is confounded with geographic and military base environment, further research should try to disentangle the large hidden variance due to MOS factors.

The two analyses that used MOS as the unit of analysis must be considered together to determine the effect of removing the pregnancy attrition cases. Indeed, neither gender, traditionality, nor their interaction was significant when the pregnancy attrition cases were excluded. This does not necessarily imply that removing these cases leaves the male and female samples identical. Although male and female attrition rates were comparable, the types of attrition were not.

Type of Attrition

The largest differences across all the separation categories were directly related to gender. The fact that pregnancy-related attrition was the most frequent "optional" type of separation makes it of special interest in the

study of female attrition. It is compared with other categories of separation that are mostly involuntary.

It may be surprising that highly educated women with high aptitude separate from the Army relatively often because of pregnancy. However, low-aptitude, less educated soldiers separate more frequently for training-related and adverse reasons; therefore, all the other types of separation are relatively less frequent because of the ipsative nature of these proportions. This may be the only reason why highly educated women separate more often because of pregnancy. Perhaps this same reasoning applies in the area of traditionality: Pregnancy attrition is more common in the traditional MOSs since EDP and adverse separations are clearly more common in nontraditional MOSs.

Future research on Army families that investigates the relationship of family planning and military career planning may guide policymakers to a number of options that could eventually reduce what is now called pregnancy attrition.

The higher rate of female attrition is not due strictly to pregnancy attrition. Women also separated more for "other family reasons" related to needs of dependents. General family concerns present the largest contrast between men and women and to some degree explain the higher female attrition rate.

Although gender is in several cases related to a particular type of separation, other variables enter the interaction with sometimes strong effects. In the case of TDP, the relatively low attrition for black women compared with white men is probably due to a combination of a much higher proportion of high school graduates, higher AFQT scores, and the intangible general effect resulting in lower attrition rates for blacks. Also, TDP is influenced by the relatively low nontraditional attrition by AFQT, which seems to imply that the academic nature of the TDP period is especially severe on the low AFQT soldiers who are accepted in traditional jobs.

Medical and adverse attrition were relatively common among men. The high proportion of medical attrition for male high school graduates is probably easily explained by the fact that more men are in the physically demanding jobs.

Men had a substantially greater proportion of adverse attrition (e.g., problems with civilian and military police) than did women. Women in general do not act out their hostilities with the same behaviors as men do in our society, civilian or military. This generalization is limited by the wide range of MOS attrition, although adverse attrition occurs more frequently in the nontraditional MOSs.

Men without high school diplomas were particularly vulnerable to adverse separation, but surprisingly their TDP proportion was not higher than for men with diplomas. This is an indication that high school education is useful as a predictor of enlisted success for academic reasons, since many TDP separations are for failure of Basic Training or Advanced Individual Training on academic grounds. But the high school dropout is more likely to cause serious problems of a nonacademic nature, such as trouble with military of civilian authorities.

Finally, a summary statistic not mentioned elsewhere in this report is the total nonadverse attrition--the sum of medical, family, and other nonadverse attrition. Proportions of nonadverse attrition are as follows: for black women, .37; for white women, .26; for black men, .16; and for white men, .20. Therefore not only was the absolute attrition substantially lower for black women, as described earlier, but the proportion of nonadverse attrition was strikingly higher for this group. It is not apparent that other variables, such as education or AFQT scores, could account for this disparity. Causes of the black enlisted women's success should be studied as a possible step toward reducing attrition in general.

Meaning of Attrition

Attrition rates such as those discussed in this report are initially caused by Army policies and regulations that separate individuals under certain conditions. For example, the regulations changed during the All Volunteer Army and large numbers of people were separated early in the Trainee Discharge Program and Expeditious Discharge Program. These programs purposely separated more persons than before 1973 in order to rid the enlisted ranks of troublemakers and individuals who could not be motivated in a military setting. By example, then, the Army may raise or lower attrition rates at will.

Given a static policy and regulation environment, the lower the attrition rate the better. However, also involved is the likelihood of any individual to separate. Attrition rates will change if soldier characteristics correlated with attrition change. If the percentage of high school graduates increases, for example, the total attrition rate will decrease.

What is the ideal attrition rate? It would be zero only if selecting successful soldiers were a perfect process. However, the process is not perfect, since unsuccessful soldiers must later be separated before their tours of duty are complete. Also, is it necessarily a deficiency of the Army to have differential MOS attrition? Is it not possible that some enlisted skills are more difficult by nature than others and that more soldiers will be separated from technically more difficult courses? Thus, the critical point for the Army is to operate efficiently a personnel system with a certain number of new accessions who have certain abilities; the rate of attrition is probably not the most important measure of the Army's success in doing this.

The first-tour loss of early separation versus zero loss if a soldier completes his or her tour is often seen as an absolute. However, operationally, first-tour attrition involves the loss of a certain number of months of a soldier at a particular grade and MOS and the necessity of obtaining a replacement. What is not so obvious is the benefit side of the equation. A crude approximation of a soldier's worth might be that he or she is partly beneficial after completing basic training and mostly or wholly beneficial after Advanced Individual Training at a given rank. Thus, the timing of attrition affects not only the total months of duty time to be replaced but the current state of readiness as well. Study of this metric is needed and would enhance the meaning of statistics on attrition rate.

CONCLUSIONS

1. The rate of female attrition was sharply differentiated from the rate of male attrition for the fiscal year 1976 noncombat cohorts. Although the women in general had a higher level of civilian education and higher aptitude scores than the men, their attrition rate was higher.

2. The type of attrition (official reason for early separation) was quite different for women than for men. Pregnancy and other family-related reasons accounted for about 37% of all female attrition. These types of attrition are at the individual's option. Therefore, it would be profitable to initiate research on (1) environmental and other reasons for women to take the separation option and (2) the changes that could be made in the environment to reduce such attrition.

3. Female traditionality of MOS was associated with female attrition, even though the range of individual MOSs within a traditionality category was quite wide. The causal factors behind this association merit further research.

4. Education, specifically high school graduation, is the single best predictor of successful completion of the first tour.

5. Finally, the underlying reason for the lower attrition rates for black women, especially for adverse attrition, should be the subject of continuing research. It is possible that such research could aid in the development of counterattrition programs for enlisted personnel in general.

CAUTION TO THE READER

Several factors should be considered before generalizing from these data to the population of women and men in the Army. These factors include rules and regulations that have changed from 1976 to 1980 and specific characteristics of this data base.

1. In 1976, all women entering the Army had to fulfill two requirements. They had to

   a. have a high school degree or GED equivalent and
   b. have scored above 59 on the Armed Forces Qualifying Test.

In 1979, requirements for women were changed to be more like the requirements for men. For men, there was no high school degree requirement in 1976, and the regulations have remained more constant since then.

2. In fiscal year 1976, all pregnant women were automatically eliminated from the service. Since 1977, pregnant soldiers have had the option to leave the service or remain on active duty.

3. Until 1979, the U.S. government paid for all abortions for service members. They did not provide abortions in most circumstances. It is unknown what effect the nonpayment of abortions would have on total female pregnancy discharges.

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APPENDIX A

MOS ATTRITION

The MOS attrition tables in this appendix were constructed and organized by fill rate and female traditionality. Some MOSs were discontinued or merged. The data tables reflect those MOS changes that could be confirmed by MILPERCEN and have been revised from earlier drafts (February 1981).

Table A-1

MOS Attrition by Gender: Traditional Female MOSs

MOS	Male		Female		Female (pregnancy attrition excluded)	
	N	Percentage	N	Percentage	N	Percentage
			High-fill MOSs			
05C[a]	214	38.8	168	45.2	154	40.3
31M	174	36.2	251	45.4	225	39.1
71L[a]	338	32.7	1,697	36.8	1,575	30.5
71M	29	24.1	243	36.6	218	29.4
72E	183	33.3	824	41.7	738	35.0
73C	58	12.1	448	30.4	406	23.2
75B	87	43.7	378	40.2	337	32.9
75C	29	34.5	181	34.3	160	25.6
75D	54	35.2	173	34.1	159	28.3
75E	15	33.3	127	52.0	113	46.0
91B	559	36.1	237	38.4	208	29.8
91C	29	6.9	234	23.1	218	17.4
91E	20	10.0	127	29.1	116	22.4
92B	27	14.8	108	25.0	105	20.6
			Low-fill MOSs			
03C	11	18.2	15	40.0	14	35.7
05B[a]	129	40.3	67	47.8	58	39.7
26Q	21	4.8	57	17.5	48	2.1
31N	14	50.0	69	55.1	61	49.2
31V[a]	104	42.3	70	37.1	68	35.3
32D	18	27.8	29	37.9	25	28.0
71D	19	10.5	95	38.9	84	31.0
71G	18	27.8	29	27.6	27	22.2
91D	27	29.6	56	26.8	53	22.6
91P	10	10.0	49	36.7	46	32.6
91R	14	50.0	96	28.1	88	21.6
91T	11	27.3	11	18.2	10	10.0

[a]These groupings include some discontinued MOSs: 05C = 05C + 05F; 71L = 71L + 71B + 71F; 05B = 05B + 05E; 31V = 31V + 31B.

Table A-2

MOS Attrition by Gender: Less Traditional Female MOSs

MOS	Male		Female		Female (pregnancy attrition excluded)	
	N	Percentage	N	Percentage	N	Percentage
			High-fill MOSs			
76D	291	27.8	288	33.3	259	25.9
76Y	293	34.8	362	34.0	331	27.8
94B	469	47.8	1,431	48.5	1,262	41.6
95B	539	24.5	610	42.0	551	35.8
96B	24	29.2	123	38.2	112	32.1
98G	59	11.9	118	32.2	96	16.7
			Low-fill MOSs			
43E	35	42.9	51	64.7	49	63.3
57E	36	44.4	15	60.0	13	53.8
74D	10	20.0	47	8.5	46	6.5
76J	10	40.0	59	33.9	57	31.6
76P	53	64.2	66	47.0	56	37.5
76V	48	41.7	52	38.5	46	30.4
95C	63	27.0	67	47.8	57	38.6

Table A-3

MOS Attrition by Gender: Nontraditional Female MOSs

MOS	Male		Female		Female (pregnancy attrition excluded)	
	N	Percentage	N	Percentage	N	Percentage
High-fill MOSs						
31J	33	12.1	156	46.8	140	40.7
36C[a]	218	39.9	201	51.7	181	46.4
55B	61	42.6	195	43.1	181	38.7
63B[a]	638	40.1	223	54.3	197	48.2
63H	174	28.7	102	50.0	84	39.3
64C	549	36.6	902	50.2	793	43.4
67N	62	24.2	105	27.6	95	20.0
71N	27	25.9	115	34.8	105	28.6
Low-fill MOSs						
05H	35	22.9	96	45.8	89	41.6
05K	11	36.4	28	14.3	26	7.7
26L	18	55.6	75	77.3	65	73.8
26V	14	50.0	68	63.2	63	60.3
31E	20	30.0	35	54.3	31	48.4
31S	14	21.4	29	34.5	26	26.9
35E	12	50.0	35	48.6	32	43.8
35K	16	31.3	21	61.9	18	55.6
36H[a]	17	23.5	50	38.0	45	31.1
36K	473	44.0	82	46.3	71	38.0
44B	29	34.5	13	46.2	10	30.0
45B	16	18.8	17	58.8	15	53.3
45K	30	36.7	55	41.8	51	37.3
45L	24	45.8	15	20.0	14	14.3
51B	115	13.0	53	37.7	46	28.3
51N[a]	55	40.0	16	43.8	15	40.0
51R	28	42.9	14	78.6	13	76.9
52D	81	9.9	61	27.9	57	22.8
54E	18	38.9	20	20.0	18	11.1
57H	37	54.1	16	50.0	15	46.7
61B	40	30.0	37	67.6	30	60.0
62B	147	34.7	20	55.0	17	47.1
62F[a]	63	33.3	55	52.7	50	48.0
62J	29	37.9	15	73.3	12	66.7
63C	206	33.0	52	51.9	45	44.4
63F	105	38.1	35	54.3	34	52.9
63G	31	35.5	22	54.5	19	47.4

[a]These groupings include some discontinued MOSs: 36C = 36C + 72C; 63B = 63B + 52B; 36H = 36H + 36G; 51N = 51N + 51K; 62F = 62F + 62M.

Table A-3 (Continued)

MOS	Male		Female		Female (pregnancy attrition excluded)	
	N	Percentage	N	Percentage	N	Percentage
			Low-fill MOSs			
63J	29	41.1	20	25.0	18	16.7
67G	12	8.3	13	46.2	11	36.4
67U	14	14.3	16	43.8	13	30.8
67V	57	24.6	36	38.9	32	31.3
68G	32	21.9	22	40.9	19	31.6
71P	32	21.9	42	23.8	38	15.8
76W	52	28.8	55	43.6	49	36.7
81C	10	10.0	16	18.8	15	13.3
93H	15	20.0	85	36.5	81	33.3
93J	20	30.0	59	39.0	53	32.1
98C	21	19.0	46	13.0	44	9.1

APPENDIX B

CHI-SQUARE ANALYSIS FOR LOW-FILL SAMPLE

Table B-1

Multidimensional Chi-Square Analysis of Individual Attrition: Low-Fill Sample

	df	Chi-square	Significance level
Effect			
Education	1	115	.0001
Gender	1	28	.0001
Race	1	14	.0001
Interaction			
Gender-race	1	32	.0001
Gender-traditionality	2	13	.0014
Education-race	1	7	.0078

Note. N = 5,058.

Table B-2

Attrition Rate Table: Significant Chi-Square Interactions for Low-Fill Sample

Variable	Attrition rate (percentage)	Number of attritees	Attrition rate (percentage)	Number of attritees	Overall attrition rate (percentage)	Total number of attritees
	Gender					
	Male		Female			
Race						
White	34	1,960	45	2,087	40	4,047
Black	36	666	26	345	33	1,011
Total	35	2,626	42	2,432		
Traditionality						
Traditional	35	395	36	641	35	1,036
Less traditional	42	255	42	354	42	609
Nontraditional	34	1,976	45	1,437	38	3,413
Total	35	2,626	42	2,432		
	Education					
	HSDG		NHSDG			
Race						
White	35	2,869	50	1,178	40	4,047
Black	26	695	50	316	33	1,011
Total	33	3,564	50	1,494		

Note. N = 5,058.

APPENDIX C

ANALYSIS OF VARIANCE FOR LOW-FILL SAMPLE

Table C-1

Analysis of Variance for Gender x Traditionality: Low-Fill Sample

	SS	df	MS	F	Significance
Between MOS groups	75,290	56			
Traditionality	1,269	2	635	2.13	NS
Error	16,072	54	298		
Within MOS groups	10,715	57			
Gender	983	1	983	7.47	*
Gender x traditionality	338	2	169	1.29	NS
Error	7,102	54	132		

MOS traditionality	Attrition rate (%)			N
	Male	Female	Total	
Traditional	28	34	31	12
Less traditional	40	43	42	7
Nontraditional	31	44	38	38
Total	33	40		

Note. N = 57.

*p < .01.

APPENDIX D

ANALYSIS OF VARIANCE EXCLUDING CASES OF PREGNANCY ATTRITION

Table D-1

High-Fill Sample

Variation	SS	df	MS	F	Significance
Between MOS groups	9,635	27			
Traditionality	322	2	161	.94	NS
Error	4,269	25	171		
Within MOS groups	1,143	28			
Gender	127	1	127	3.45	NS
Gender x traditionality	89	2	44	1.20	NS
Error	922	25	37		

	Attrition rate (%)		
MOS traditionality	Male	Female	Total
Traditional	28	30	29
Less traditional	29	30	30
Nontraditional	31	38	35
Total	29	33	

Note. N = 28.

Table D-2

Low-Fill Sample

Variation	SS	df	MS	F	Significance
Between MOS groups	66,562	56			
Traditionality	1,423	2	711	2.2	NS
Error	17,314	54	321		
Within MOS groups	8,147	57			
Gender	24	1	24	.2	NS
Gender x traditionality	297	2	149	1.1	NS
Error	7,236	54	134		

	Attrition rate (%)		
MOS traditionality	Male	Female	Total
Traditional	28	28	28
Less traditional	40	37	39
Nontraditional	31	38	35
Total	33	34	

Note. N = 57.

END

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